



EMERGENCY ACTION PLAN

CEDAR CREEK DAM

CITY OF COLUMBIA FALLS
130 6th Street West
Columbia Falls, Montana 59912

July 17, 1971

Updated: January 15, 2003

April 14, 2006

May 15, 2007

October 16, 2008

November 25, 2009

February 18, 2011

If Cedar Creek Dam is failing or failure seems imminent, call:

Flathead County Sheriff	460-260-4319 or 406-758-5585 or 911
Office of Emergency Services.....	406-758-5504
	or
	911
OES Cell.....	406-249-6913
 City of Columbia Falls Police Department:.....	 406-892-3234

TABLE OF CONTENTS

I.	INTRODUCTION	4
A.	<u>Purpose</u>	4
B.	<u>Description of Dam</u>	4
C.	<u>Access to Dam</u>	4
D.	<u>Hazard Area</u>	4
E.	<u>Responsibility and Authority</u>	4
F.	<u>Periodic Review/Update</u>	4
G.	<u>Approval</u>	5
II.	NOTIFICATION PROCEDURES	6
A.	<u>Imminent or Actual Failure</u>	6
B.	<u>Potentially Hazardous Situation</u>	8
C.	<u>Posting of the Notification Flowchart and Distribution of the EAP</u>	11
III.	MITIGATION ACTIONS	11
A.	<u>Potential Problems and Immediate Response</u>	11
B.	<u>Emergency Supplies and Resources</u>	13
C.	<u>Local Contractors and Engineers</u>	13
	APPENDICES	14
	APPENDIX A Technical Data.....	A-1
	APPENDIX B Inundation and Evacuation Maps	B-1
	APPENDIX C Telephone Directory	C-1
	APPENDIX D Dam Incident Report Form	D-1
	APPENDIX E Plan Distribution List.....	E-1

I. INTRODUCTION

A. Purpose

The purpose of this emergency action plan (EAP) is primarily to safeguard the lives of and secondarily to reduce property damage to the citizens of Flathead County living near Cedar Creek, in the event of flooding caused by Cedar Creek Dam failure.

B. Description of Dam

Cedar Creek Dam is in Flathead County, in Sections 27 and 34, Township 31 North (T31N), Range 20 West (R20W), and located on Cedar Creek, a tributary to the Flathead River. It is owned by the City of Columbia Falls, 130 6th Street West, Rm A, Columbia Falls, Montana 59912, and is used as a flood control structure. Technical data pertaining to Cedar Creek Dam are shown in Appendix A.

C. Access to Dam

Cedar Creek Dam is located off of Mt State Highway 486 about 585 two miles northeast of Columbia Falls. This is the access off the North Fork Road to the city's drinking water storage tank and the dam. Access is also available through Columbia Falls Aluminum Company, (CFAC) Property. Note that the county road may become flooded.

D. Hazard Area

The evacuation area extends along Cedar Creek to a point on the north side of the Burlington Northern Railroad just north of the Columbia Falls city limits as shown in the map in Appendix B. Hazards include the possible inundation of occupied dwellings, the North Fork Road and other county roads. Inundation and evacuation maps are in Appendix B.

E. Responsibility and Authority

Pursuant to the Dam Safety Act, Chapter 15 of Title 85, MCA, the dam owner is responsible for production, coordination, maintenance, and implementation of this emergency action plan. The extent of owner implementation is defined through coordination of this plan with the County Sheriff and Office of Emergency Services (OES) coordinator.

F. Periodic Review/Update

The owner shall review/update this EAP annually. Review/update by a qualified professional engineer will be accomplished as required by the dam's operating permit, but no less than every five years.

G. Approval

By my signature, I acknowledge that I, or my representative, have reviewed this plan and agree to the tasks and responsibilities assigned herein for my department and/or agency.

_____	Signature	Date
OWNER, CEDAR CREEK DAM		

_____	Signature	Date
FLATHEAD COUNTY SHERIFF'S DEPARTMENT		

_____	Signature	Date
OFFICE OF EMERGENCY SERVICES		

II. NOTIFICATION PROCEDURES

A. Imminent or Actual Failure

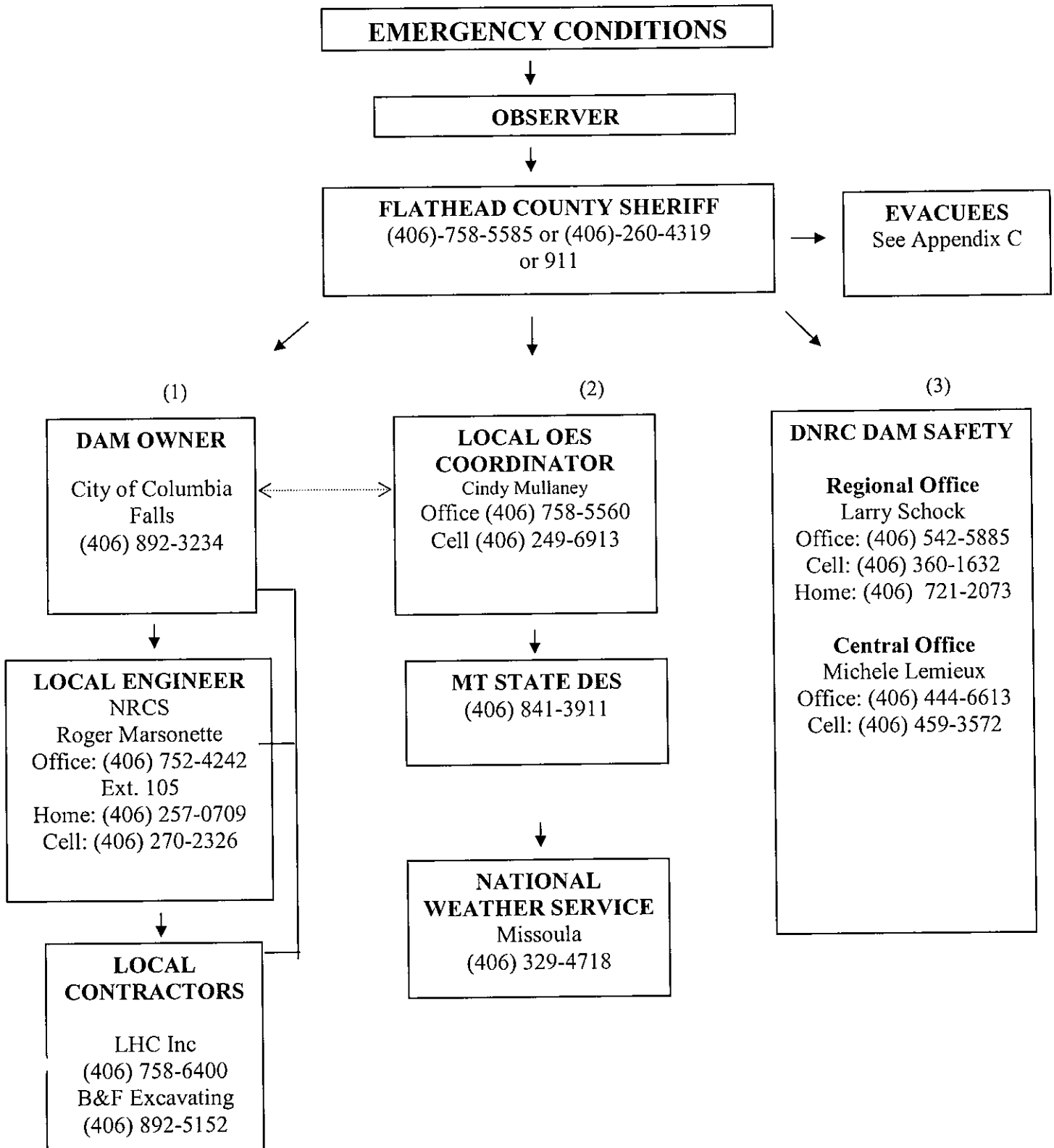
IF CEDAR CREEK DAM IS FAILING, TWO THINGS MUST BE DONE IMMEDIATELY:

- (1) Residents in the hazard area downstream from the dam must be warned according to the county warning plan, and initiated as shown in Figure 1, and
- (2) Any steps that might save the dam or reduce damage to the dam or hazard area downstream should be taken. (Refer to the map in Appendix B to determine the areas that are likely to be inundated if the dam fails).

As the owner of the dam, it is the Columbia Falls Director of Public Works (Lorin Lowry) or the City Manager (William Shaw) responsibility to:

1. Call the Sheriff's Dispatch Center (260-4319 or 758-5585 or 911) and Office of Emergency Services (758-5504 or 249-6913), if they have not already been notified. Be sure to say, "This is an emergency." They will call other authorities and the media and begin the warning plan.
2. Warn anyone in immediate danger to evacuate to safety. This includes someone on the dam, directly below the dam, or boating on the reservoir, or downstream evacuees, if so directed by the sheriff.
3. Contact the Disaster and Emergency Services staff at least once every hour. They may request your assistance in evacuating residents.
4. If all means of communication are lost:
 - a. Try to find out why
 - b. Try to get another phone or radio that works.
 - c. Get someone else to try to reestablish communications.
 - d. If these means fail, take care of immediate problems and periodically try to reestablish contact with OES.

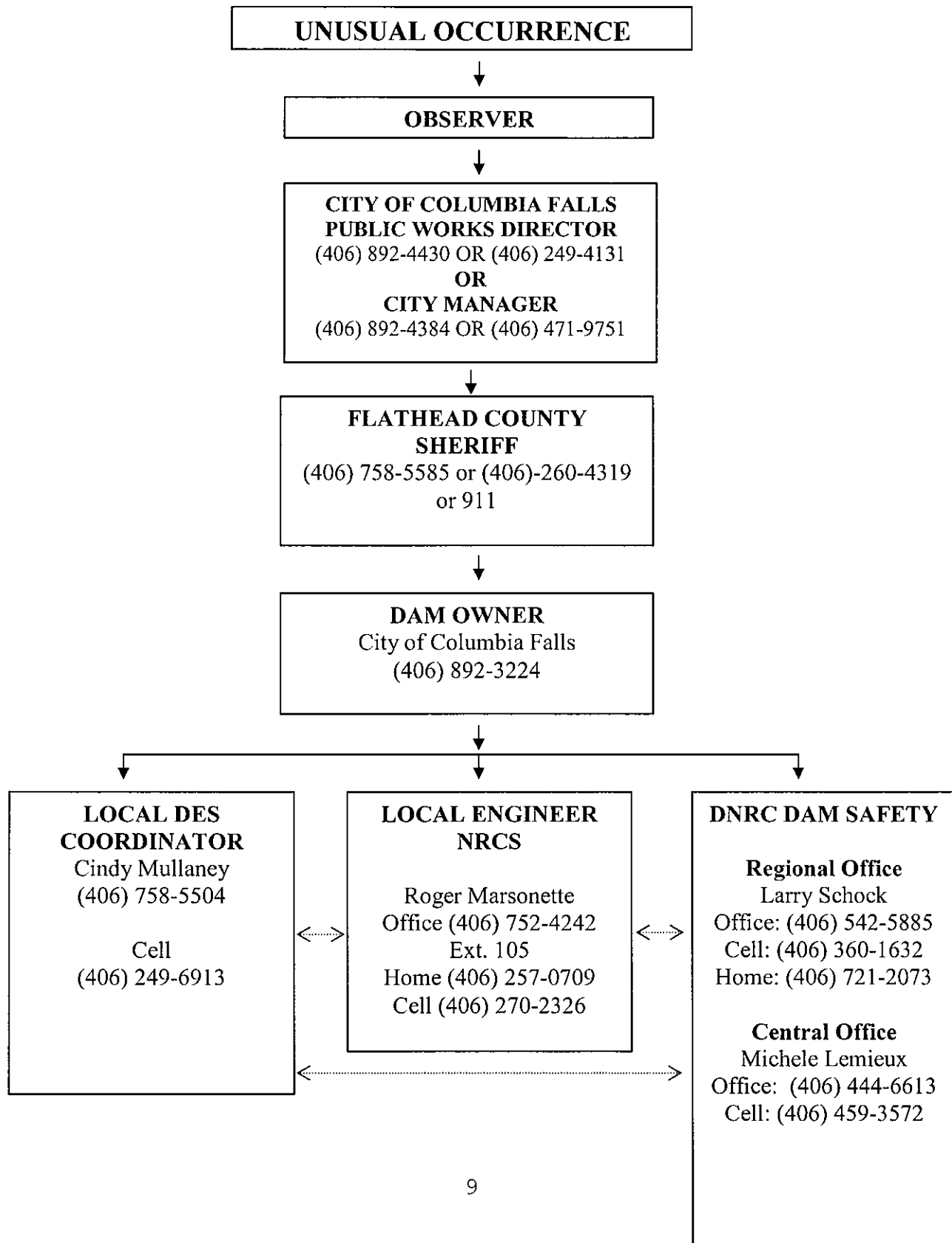
**FIGURE 1
CEDAR CREEK DAM
ACTUAL OR IMMINENT FAILURE
"NOTIFICATION FLOW CHART"**



Potentially Hazardous Situation

A potentially hazardous situation is an event or condition not normally encountered in the routine operation of the dam and reservoir. Among the unusual occurrences that may affect the dam are dam embankment problems (see section B.2.), failure of the spillway or outlet works, heavy precipitation or rapid spring snow melt, landslides, earthquakes, erosion, theft, vandalism, acts of sabotage, and serious accidents. These occurrences may endanger the dam, the public, or the downstream valley and may necessitate a temporary or permanent revision of the dam's operating procedures. Help in these situations can be obtained by notifying those people shown in Figure 2.

**FIGURE 2
CEDAR CREEK DAM
POTENTIALLY HAZARDOUS SITUATION
"NOTIFICATION FLOW CHART"**



1. If the dam owner discovers an unusual condition of the dam embankment that could threaten the structure:

- a. Complete the Dam Incident Report Form in Appendix D.
- b. Have a qualified engineer inspect the dam as soon as possible to determine whether emergency action is necessary.
- c. Notify the county Office of Emergency Services Coordinator (758-5504) of the potential problem.
- d. Contact the Dam Safety Program of the Department of Natural Resources and Conservation (DNRC).

2. Among the conditions the dam owner should watch for are:

- a. Overtopping of the dam by flood waters
- b. Loss of material from the dam crest due to storm wave erosion
- c. Slides on either the upstream or downstream slope of the embankment as evidenced by
 1. Sloughing
 2. Cracking
 3. Bulging
 4. Scarping
- d. Erosional flows through, beneath, or around the embankment as evidenced by
 1. Excessive seepage
 2. Discoloration of the seepage
 3. Boils on the downstream side
 4. Sinkholes
 5. Changes in the flow from drains
- e. Failure of outlets or spillways due to clogging or erosion
- f. Movement of the dam on its foundation as evidenced by
 1. Misalignment
 2. Settlement
 3. Cracking

3. Before calling either an engineer or DNRC to report a problem, the dam owner shall use the form in Appendix D to ensure sufficient information is provided for the engineer to analyze the problems. After talking to the engineer, it may be helpful to document the condition of the dam by making a sketch on the form in Appendix D, showing the extent of the problem. Revise the sketch periodically if the problem develops further. Section III includes further guidelines for courses of action to take mitigate the effect of many problems.

- C. Posting of the Notification Flowchart and Distribution of the EAP.
Copies of the EAP are filed at City Hall in the Director of Public Works Office, the Police Department, and City Water Shop in the Lead Water Operator's Office. The Public Works Director has a copy at home. The Flathead County Sheriff, 911 Dispatch Center, and OES have copies. The local NRCS has a copy, along with the regional and the central office of the DNRC Dam Safety. Mt Disaster and Emergency Services and the National Weather Service also have copies.

III. MITIGATION ACTIONS

Besides normal monitoring of the dam's condition, which is done at least monthly, the owner will provide continuous monitoring and inspection during and after extreme events such as storms and earthquakes. Information on the magnitude of an earthquake or storm can be obtained from the DNRC Dam Safety Program. Actions are suggested below to mitigate problems that may develop, but those actions should never be continued at the risk of injury or at the expense of lessening efforts related to evacuation. Monitoring should identify any of the following potential problems.

A. Potential Problems and Immediate Response Actions

1. OVERTOPPING BY FLOOD WATERS
 - a. Open outlet to its maximum safe capacity.
 - b. Place sandbags along the crest to increase freeboard and force more water through the spillway and outlet.
 - c. Provide erosion-resistant protection to the downstream slope by placing plastic sheets or other materials over eroding areas.
 - d. Divert flood waters around the reservoir basin, if possible.
 - e. Create additional spillway capacity by making a controlled breach in a low embankment or dike section where the foundation materials are erosion-resistant.
2. LOSS OF FREEBOARD OR DAM CROSS SECTION DUE TO STORM WAVE EROSION
 - a. Place additional riprap or sandbags in damaged areas to prevent further embankment erosion.
 - b. Lower the water level to an elevation below the damaged area.
3. SLIDES IN THE UPSTREAM OR DOWNSTREAM SLOPE OF THE EMBANKMENT
 - a. Lower the water level at a rate and to an elevation considered safe, given the slope condition. If the outlet is damaged or blocked, pumping, siphoning, or a controlled breach may be required.
 - b. Stabilize slides on the downstream slope by
 1. Weighting the toe area with additional soil, rock, or gravel, and then
 2. Restoring lost freeboard by placing sandbags at the crest.

4. EROSIONAL FLOWS THROUGH THE EMBANKMENT, FOUNDATION, OR ABUTMENTS
 - a. Plug the flow with whatever material is available (hay bales, bentonite, or plastic sheeting if the entrance to the leak is in the reservoir basin).
 - b. Lower the water level until the flow decreases to a non-erosive velocity or stops.
 - c. Place a protective sand-and-gravel filter or boil ring over the exit area to hold materials in place.
5. FAILURE OF APPURTENANT STRUCTURES SUCH AS OUTLETS OR SPILLWAYS
 - a. Implement temporary measures to protect the damaged structure, such as closing an outlet or protecting a damaged spillway with riprap.
 - b. Lower the water level to a safe elevation. If the outlet is inoperable, pumping, siphoning, or a controlled breach may be required.
6. MASS MOVEMENT OF THE DAM ON ITS FOUNDATION (SPREADING OR MASS SLIDING FAILURE)
 - a. Immediately lower the water level until excessive movement stops.
7. EXCESSIVE SEEPAGE AND HIGH LEVEL SATURATION OF THE EMBANKMENT
 - a. Lower the water to a safe level.
 - b. Continue frequent monitoring for signs of slides, cracking or concentrated seepage.
8. SPILLWAY BACKCUTTING, THREATENING RESERVOIR EVACUATION
 - a. Reduce the flow over the spillway by fully opening the main outlet.
 - b. Provide temporary protection at the point of erosion by placing sandbags, riprap materials, or plastic sheets weighted with sandbags.
 - c. When the inflow subsides, lower the water to a safe level.
9. EXCESSIVE SETTLEMENT OF THE EMBANKMENT
 - a. Lower the water level by releasing it through the outlet pumping, siphoning, or a controlled breach.
 - b. If necessary, restore freeboard, preferably by placing sandbags.

B. Emergency Supplies and Resources

Hamilton Excavating and Gravel
6100 Hwy 2 West
Columbia Falls, Montana 59912..... (406) 892-2257

LHC Inc
1179 Stillwater Road
Kalispell, Montana 59901 (406) 758-6400

Weaver Gravel
1190 Elk Park Rd.
Columbia Falls, Montana 59912..... (406) 755-0212

C. Local Contractors and Engineers

Local Contractors:

Schellinger Construction Co Inc
250 truck Rt
Columbia Falls, Mt 59912 (406) 892-2188

LHC Inc
1179 Stillwater Road
Kalispell, Montana 59901 (406) 758-6420

B&F Excavating
455 4th Ave EN
Columbia Falls, Montana 59912..... (406) 892-5152
(406) 253-5712

Engineers:

Natural Resources Conservation Service (NRCS)
Roger Marsonette..... (406) 752-4242 ext 105

WMW Engineering..... (406) 862-7826
Morrison – Maierle (406) 752-2216

APPENDICES

APPENDIX A

Technical Data For Cedar Creek Dam

Max Reservoir Capacity to the Crest of the Dam:.....2,720 acre feet

Normal Reservoir Capacity Measured to the Principal Spillway Crest:.....390 acre feet

Normal Water Depth Measured from the Streambed to the Crest of the Emergency Spillway50 feet

Dam Height Measured From Streambed to Crest of the Dam:.....86 feet

Dam Crest Width:20 feet

Length of Dam Crest:.....1,220 feet

Outlet Capacity:150 cubic feet per second

Spillway Capacity2,150 cubic feet per second

Date Constructed.....1971

Slope of Upstream Face of Dam (Horizontal to Vertical)
..... 2.5:1

Slope of Downstream Face of Dam (Horizontal to Vertical)
.....2:1

APPENDIX B

Inundation & Evacuation Maps

FLOOD CREST SUMMARY, STORM - INDUCED BREACH

	FEET	MILES	MAXIMUM Flow Rate	MAXIMUM Stage	MAXIMUM Depth	MAXIMUM Storage	Time of MAXIMUM
CEDAR CR.	0	0.00	66,808 CFS	3243.0	46.0	1,980 AC-FT	0.67 hrs
REACH #1	100	.02	66,682	3209.2	12.2		0.67
REACH #2	4,000	.76	65,622	3130.8	10.8		0.73
REACH #3	6,800	1.29	58,961	3117.6	7.6		0.80
ROAD	10,982	2.08	8,724	3111.5	~11.5	1,673	1.23
REACH #4	21,120	4.00	8,490	3085.5	5.5		2.20
RAILROAD	21,806	4.13		3084.5	4.5	857	7.30
				* 3090.5	10.3	1,980	387 hrs

~ The actual depth of the water overflowing the road embankment is 1.5 feet.

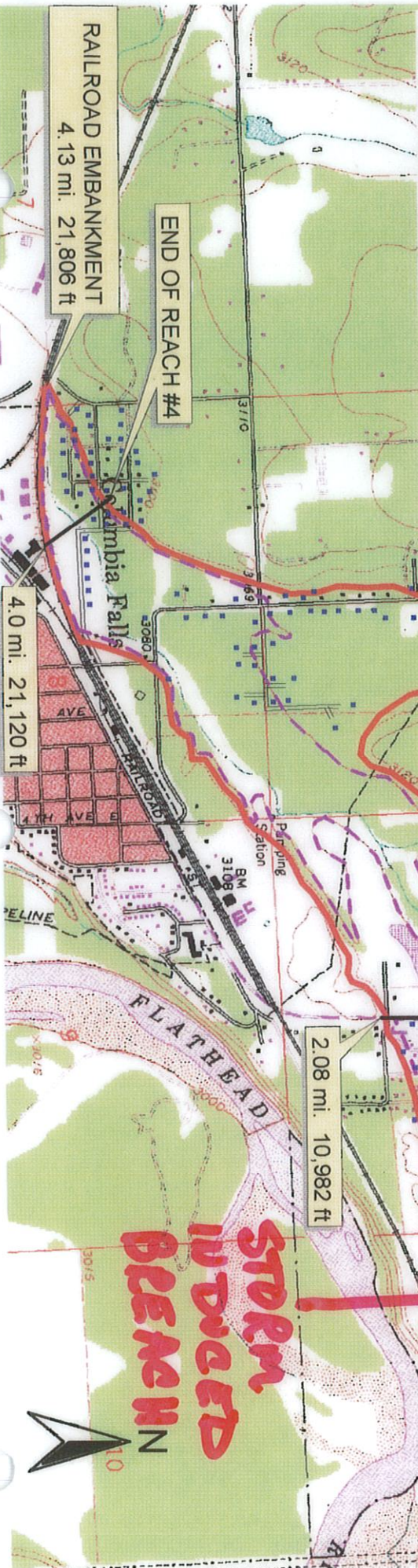
~ Since there is an outlet at the road embankment, and no outlet at the railroad embankment, the water impounded behind the road embankment will flow under the road through 2 CMP pipes. The capacity of the culverts is 52 CFS. At a rate of 52 CFS, the 1673 AC-FT impounded behind the road will be fully drained in 387 HRS (16.1 days). The drainage water will raise the level of the water impounded behind the railroad embankment to the maximum elevation of 3090.5 FT. The maximum depth after the 16.1 days will be 10.3 feet.

FLOOD CREST SUMMARY, CLEAR WEATHER BREACH

	FEET	MILES	MAXIMUM Flow Rate	MAXIMUM Stage	MAXIMUM Depth	MAXIMUM Storage	Time of MAXIMUM
CEDAR CR	0	0.00	12,780 CFS	3226.5	28.50	390 AC-FT	0.67 hrs
REACH #1	100	0.02	12,780	3201.5	4.54		0.67
REACH #2	4,000	0.76	12,435	3125.7	5.70		0.67
REACH #3	6,800	1.29	9,850	3114.0	4.00		0.97
ROAD	10,982	2.08	~ 52	3107.1	7.06	390	1.00 flow 4.27 storage
REACH #4	21,120	4.00		3080.8	0.80		1.00
RAILROAD	21,806	4.13		3082.0	2.0	* 390	91.0 storage

~ Capacity of the culverts under the road embankment. There are two CMP culverts that convey water under the road embankment. The approximate combined capacity of the two culverts is 52 CFS.

~ There is no outlet at the railroad embankment. Therefore, after 91 hrs the original 390 AC-FT will be impounded behind it.



APPENDIX C

Telephone Directory

A. Priority One

1. SHERIFF Flathead County(406) 260-4319 or (406) 758-5869 or 911

2. OFFICE OF EMERGENCY SERVICES Flathead County
625 Timberwolf Parkway
Kalispell, Mt 59901
Cindy Mullaney Office: (406) 758-5504
..... Cell (406) 249-6913

Mt State Disaster and Emergency Services (Helena)
.....(406) 841-3911

3. EVACUEES (in upstream-to-downstream sequence)

Thompson property, 1575 Aluminum Drive
Jack Von Linderin, care taker: 406-890-3158 or 406-892-5751
.....
Julie Grange, daughter Cell: (206) 914-2712
John Grange(206) 914-2711

Russ Vukonich, 1495 Aluminum Drive 406-892-1740

Mary McDougall, 1625 North Fork Road (Rachel-no return call) 406-270-1985

Duncan Oswald, 1621 North Fork Road.....406-892-0228

Nick Stemborski, 1611 North Fork Road406-892-8830

Karen South, 1520 North Fork Road406-212-3785

Wayne Stevens, 1492 North Fork Road.....406-892-7237
Wayne Stevens, Cellular.....406-250-2309

Marlys Kopitzke, 1350 Aluminum Drive.....406-892-5563

Andy Mata, 1570 Majorie.....406-261-7027 or 406-261-8391

Gene Kopitzke, 1450 North Fork Road.....406-892-2056

Marge & Mark Hader, 1580 Aluminum Drive..... 406-892-5721

Kari Green, 1535 15th Ave EN.....406-892-2163

Jason & Jessica Lesker, 1555 North Fork Road406-892-0053

Jessica Lesker's Cellular 406-890-0704

Please Note: This is a list only of people near the creek. Not all of the people in Aluminum City.

B. Priority Two

4. LOCAL ENGINEERS

Natural Resources Conservation Service (NRCS)
 Roger Marsonette (406) 257-0709 HomeOffice: (406) 752-4242 Ext. 105

5. MONTANA DEPT. OF NATURAL RESOURCES AND CONSERVATION

Larry Schock, Regional Engineer Office: (406) 542-5885
 Cell: (406) 360-1632
Home: (406) 721-2073

Michele Lemieux (Dam Safety Program Engineer) Office: (406) 444-6613
 Cell: (406) 459-3572

Laurence Siroky (Water Operations Bureau) Office: (406) 444-6816
 Home: (406) 442-2806
 Cell: (406) 431-7475

6. NATIONAL WEATHER SERVICE

Missoula.....(406) 329-4718

Great Falls.....(406) 453-9642

7. CITY OF COLUMBIA FALLS:

Director of Public Works - Lorin Lowry Cell: (406) 249-4131
.....Work..... (406) 892-4430
Email: cfdpw@centurytel.net

Police Department.....(406) 892-3234

8. COLUMBIA FALLS ALUMINUM CORPORATION:

CFAC Security, Steve Wright-Manager..... (406) 892-8245 or (406) 892-8400

CFAC Environmental(406) 892-8213

9. Red Cross1-800-ARC-MONT

1-800-272-6668

APPENDIX D

Dam Incident Report Form

DATE: TIME:

NAME OF DAM:

STREAM NAME:

LOCATION:

COUNTY:

OBSERVER:

OBSERVER TELEPHONE:

NATURE OF PROBLEM:

LOCATION OF PROBLEM AREA (Looking Downstream):

EXTENT OF PROBLEM AREA:

FLOW QUANTITY AND COLOR:

WATER LEVEL IN RESERVOIR:

IS SITUATION WORSENING?

EMERGENCY STATUS:

CURRENT WEATHER CONDITIONS:

ADDITIONAL COMMENTS:

APPENDIX E

Emergency Action Plan Distribution List

<u>PLAN HOLDER</u>	<u>NUMBER OF COPIES</u>
Dam Owner, City of Columbia Falls	4
Flathead County Sheriff.....	1
800 S Main Street Kalispell, Mt 59912	
Local OES Coordinator.....	1
625 Timberwolf Parkway Kalispell, Mt 59912	
911 Center.....	1
625 Timberwolf Parkway Kalispell, Mt 59912	
Mt DES.....	1
Mt Disaster and Emergency Services C/O Dave Maser PO Box 4789 Fort Harrison, Mt 59636-4789	
DNRC Dam Safety Program.....	3
EAP Coordinator Chad Newman Department of Natural Resources and Conservation Water Resources Division Dam Safety Division 1424 9 th Ave PO Box 201601 Helena, Mt 59620-1601 Email: cnewman@mt.gov	
Michele Lemieux Department of Natural Resources and Conservation Water Resources Division Dam Safety Division 1424 9 th Ave PO Box 201601 Helena, Mt 59620-1601	

Larry Shock
Civil Engineering Specialist
Department of Natural Resources and Conservation
Water Resources Division Regional Office
PO Box 5004
Missoula, Mt 59806

Natural Resources and Conservation.....1

Roger Marsonette
Civil Engineer
Natural Resources Conservation Service
133 Interstate Lane
Kalispell, Mt 59901

National Weather Service2

National Weather Service
Forecast Office
6633 Aviation Way
Missoula, Mt 59806-9381

National Weather Service
C/O Gina Loss
5324 Tri Hill Frontage Rd
Great Falls, Mt 59404-4933

Annual Dam Owner's Observation Report

Earthen Dams

Purpose: 1) Identify Maintenance Needs
2.) Record Observations on dam condition

Dam Name: Cedar Creek Dam

Dam Observer: _____

Reservoir Elevation: _____

Observation Date: _____

Weather Conditions: _____

Area to be Examined	Observations	Recommended Action	Date to be completed
Embankment Crest			
surface cracks			
animal burrows			
low areas			
vegetation			
ruts			
other			
Downstream Slope			
wet areas/seepage			
slides/depressions etc.			
animal burrows			
erosion			
vegetation			
other			
Upstream Slope			
vegetation			
erosion, slides, sinkholes etc.			
slope protection			
other			

Area to be examined	Observations	Recommended Action	Date to be Completed
Downstream Toe			
	vegetation/debris		
	depressions/sinkholes		
	erosion		
	seepage		
	other		
Spillway			
	erosion/other instability		
	vegetation		
	debris		
	condition of concrete		
	approach area		
	discharge area		
	log boom		
	other		
Outlet Works			
	stilling basin		
	seepage		
	outlet pipe		
	gate		
	Intake structure		
	Tower/Drop inlet		
	Trashrack		
	other		

Annual Dam Safety Inspection Report

Area to be examined	Observations	Recommended Action	Date to be Completed
Instrumentation	attach sheet with measurements, or record measurements on back of this form		
weirs			
piezometers			
survey monuments			
Drains			
Location of Records			
Staff Gages			
Reservoir Level Pins			
other			
General Comments or sketches			

Annual Dam Owner's Observation Report

Earthen Dams

Purpose: 1) Identify Maintenance Needs
2.) Record Observations on dam condition

Dam Name: Cedar Creek Dam

Dam Observer: _____

Reservoir Elevation: _____

Observation Date: _____

Weather Conditions: _____

Area to be Examined	Observations	Recommended Action	Date to be completed
Embankment Crest			
surface cracks			
animal burrows			
low areas			
vegetation			
ruts			
other			
Downstream Slope			
wet areas/seepage			
slides/depressions etc.			
animal burrows			
erosion			
vegetation			
other			
Upstream Slope			
vegetation			
erosion, slides, sinkholes etc.			
slope protection			
other			

Annual Owner's Observation Report

Area to be examined	Observations	Recommended Action	Date to be Completed
Downstream Toe			
vegetation/debris			
depressions/sinkholes			
erosion			
seepage			
other			
Spillway			
erosion/other instability			
vegetation			
debris			
condition of concrete			
approach area			
discharge area			
log boom			
other			
Outlet Works			
stilling basin			
seepage			
outlet pipe			
gate			
Intake structure			
Tower/Drop inlet			
Trashrack			
other			

Annual Dam Safety Inspection Report

Area to be examined	Observations	Recommended Action	Date to be Completed
Instrumentation	attach sheet with measurements, or record measurements on back of this form		
weirs			
piezometers			
survey monuments			
Drains			
Location of Records			
Staff Gages			
Reservoir Level Pins			
other			
General Comments or sketches			